Telephony Applications Using VISM

This chapter describes the VISM card and the ways it is used in telephony applications to transport traditional TDM voice traffic as digitized voice traffic over ATM networks. The following topics are discussed:

- “Tandem Switch Offloading” section on page 2-1
- “Multiservice Access” section on page 2-3
- “AAL2 Trunking” section on page 2-3

Tandem Switch Offloading

Figure 2-1 shows VISM used to offload a Class 4 tandem switch by transporting a portion of the voice traffic across an ATM network instead of the Public Switched Telephone Network (PSTN). VISM acts as the voice gateway in this application. Use VISM in the VoIP switching or switched AAL2 PVC operating mode to enable this application.
When a call is initiated, the central office can use either the Class 4 switch or VISM to handle the call. When calls are passed to VISM, VISM backhauls the signaling to an SGCP or MGCP compliant call agent (such as the Cisco VSC 3000). The call agent at the near end manages the call setup in conjunction with the call agent at the far end and the calling and called VISM cards.

Although not shown in the diagram, an alternative method for handling CCS signaling is to transport it directly between the central office and the call agent with no VISM involvement. With this arrangement, there is no backhauling function performed in the VISM.

Each VISM card supports up to eight T1 or E1 lines for voice traffic. You can use an alternative method to connect the voice lines to the VISM cards—the TDM lines can be carried over a T3 line to an SRM card in the Cisco MGX shelf where the individual T1 lines are broken out and distributed to the VISM card internally. Refer to the Cisco MGX 8250, Release 1 and the Cisco MGX 8230 installation and configuration documents for details of the SRM card.

The VISM connects to the ATM network using either VoAAL2 or VoIP (UDP/IP packets encapsulated in AAL5 PVCs). VISM and the call agent communicate with each other and their activities are coordinated through either SGCP or MGCP.

For VoIP, when the call setup procedure is complete, each VISM has the IP address of the other VISM associated with the call. An end-to-end IP bearer circuit is established between the calling and called parties. At this point, the voice conversation can proceed.

By way of example, Figure 2-1 shows only one location for the VISM and call agent; in reality there is a similar arrangement for each tandem switch.

Figure 2-2 shows the connection from VISM to the call agent in greater detail.

Figure 2-2 VISM Used as a Voice Gateway Application

The VISM/MGX 8000 shelf is connected to the network by an OC-3 line which is used for both the voice payload and the communication with the call agent. A network edge router moves the voice traffic across the network to the called party’s VISM and routes call control information between the VISM and the call agent.

For reliability, two PVCs using separate physical links to two separate edge routers to the packet network can be established. If the primary circuit fails, transmission automatically switches to the secondary circuit. For enhanced reliability, the physical OC-3 links to the network can be protected by the SONET APS feature.

Using all the available slots, the Cisco MGX 8850 and the Cisco MGX 8250 can be configured with up to 24 VISM cards and the Cisco MGX 8230 can be configured with up to 8 VISM cards.
Each of the two lower shelf cellbuses can sustain a bandwidth of one OC-3/STM-1 link. This bandwidth limits the number of E1 ports on the lower shelf, when using the G.711 codec, to 78 (approximately 10 VISM cards).

**Multiservice Access**

A Cisco MGX 8000 series shelf, combined with one or more VISM cards, provides multiservice access between a customer’s TDM network and a voice gateway over a packet network. The voice gateway provides the interface to the telephone network.

When voice traffic is conveyed over a packet network using VISM and an MGX 8850—multiservice access—the MGX 8850 is located either at the customer’s premises (probably the case for large customer installations) or at the central office. Use VISM in the VoIP switching or switched AAL2 PVC operating mode to enable this application.

This application is very similar to the tandem switch offloading application, except that instead of performing as the voice gateway, VISM provides access to the voice gateway.

VISM operates in conjunction with an MGCP or SGCP compatible call agent via an edge router/switch on the packet network. Signaling is backhauled from VISM to the call agent through this connection. The call agent connects to the SS7 network and handles call setup and teardown across the packet network. The VISM connects to the ATM network and handles the voice payload between the TDM voice/data network and a voice gateway. For transmitting the voice payload to the network, VISM uses either VoIP transported in AAL5 ATM cells or VoAAL2.

Other data services (such as frame relay) can also be accommodated by configuring the MGX 8000 series shelf with the appropriate service modules (for example, FRSM) and using separate PVCs into the packet network.

**AAL2 Trunking**

A Cisco MGX 8000 series shelf, in combination with VISM cards, provides AAL2 trunking between a voice TDM network and voice gateways over a packet network. Use VISM in the AAL2 trunking operating mode to enable this application.

*Figure 2-3* shows a trunk with a VISM-equipped MGX 8850 shelf at one end of a trunk (at the central office) and a Cisco 3810 Multiservice Access Concentrator and a Cisco MGX 8220 edge concentrator at the other end of the trunk (customer premises).

*Figure 2-3  AAL2 Trunking—One End*
Figure 2-4 shows a trunk with a VISM-equipped MGX 8850 shelf at each end of the trunk.

**Figure 2-4  AAL2 Trunking — Two Ends**

Note

Figure 2-4 shows one trunk; however, VISM can support up to 64 trunks in this arrangement.

In Figure 2-3 and Figure 2-4, the trunk is an AAL2 nonswitched ATM PVC that carries the voice traffic. The voice traffic is delivered to, or received from, the central office over short-haul T1 lines.

If CAS signaling is used, the signaling is transported across the trunk as AAL2 type 3 cells.

If CCS signaling is used, the signaling is delivered across the ATM network as AAL5 cells over separate PVCs. VISM supports up to eight AAL5 PVCs, one for each T1/E1 line.

Other data services (such as frame relay) can be accommodated by configuring Cisco 3810, Cisco MGX 8220, or Cisco MGX 8000 hardware with the appropriate service modules and using separate PVCs into the packet network. The packet network routes these other data services as required.

In AAL2 trunking mode, VISM is not involved with a call agent and the functions of call control. Multiple calls can be transported over a single PVC using the AAL2 channel identifier (CID) mechanism. DS1/DS0s are bound to virtual channel identifier (VCI)/CIDs so that voice traffic from any particular DS0 is automatically passed to its bound VCI/CID (and vice versa).